

OUTLINE OF WORKING PLAN
FOR
COLUMBIA RIVER BASIN AREA
COMPREHENSIVE AGRICULTURAL PROGRAM

(Revised 3-7-51)

The Department of Agriculture, in cooperation with other Federal, State and local agencies, is preparing a plan for a multiple-purpose agricultural program for the Columbia River Basin Area. The basis for this plan is an inventory of the watershed land and water work that needs to be done irrespective of land ownership. Under this plan the programs and activities of the Department, as well as those of agricultural significance of other land administering agencies which relate directly to the development, utilization, and conservation of land and water resources, will be integrated into a unified program.

The plan is not intended or expected to present any startling innovations in present resource conservation, development and utilization programs or in the Department's role in these programs. Summarized briefly, the plan will call for:

1. An inventory of all agricultural needs in the basin.
2. Recommendation of a systematic scheduled action program to meet those needs.
3. A time-table for carrying on those various public activities and services which is consistent with the specific needs of the area.

The agricultural program will be designed primarily to: Conserve and improve the lands and increase their productivity; protect, utilize, and increase the productivity of the forest and range resources; protect, enhance, develop, and use the water resource; improve the use of land and water through improved farm irrigation and drainage; reduce upstream flood water and sediment damages; protect and improve recreation facilities and encourage development and maintenance of appropriate wildlife populations. Thus the agricultural program will complement and protect the major structural installations of other agencies -- particularly the Departments of the Army and the Interior.

The needs of the watersheds in the area for special measures for waterflow retardation and the prevention of soil erosion in aid of flood control will be shown in the plan. The plan report will contain a recommendation that these measures be authorized under the Flood Control Acts.

Need for the Plan

Growing concern about the adequacy of our national and regional land and water resources emphasizes the need for long-range planning. If future needs are to be met, patterns of development and use must be devised which will assure continued productivity and improvement of our soil, water and allied resources. This is particularly true in the Columbia River Basin Area because of the rapid rate of development which is occurring in this region as a result of its rapidly increasing population.

The effect of activities in any one locality is frequently felt in other localities; satisfying one interest in a resource use may result in harm to other uses. For example, the destructive use or burning of watershed cover may accentuate floods that damage improved valley lands; poor cropping practices may speed up sedimentation and shorten the life of a costly reservoir or a valuable harbor; construction of a water storage reservoir may complicate the harvesting of the forest products from a watershed.

It is certain that the large structural improvement programs for the development and utilization of the water resources which are planned and are now under way in this area will have a very marked effect on the land use of the region in the years to come. Likewise, the kind of land use which exists in the area in the future will have an equally profound effect on the success of this public works program. In view of this inter-relationship, it is necessary to coordinate plans for watershed land and water programs with plans for main stream water development programs.

Purpose

The objective of a Comprehensive Agricultural Plan for the Columbia Basin Area is to recommend an economically feasible program for the development, conservation and use of the land, water, forest and other resources, in order that they may most effectively contribute to the well-being of the people of the Basin and to the Nation as a whole. The adoption of this program will bring about an increase in and stabilization of the Basin's capacity to produce water, food and fibre crops.

What the Program Will Include

The report will outline a complete agricultural program; it will be dynamic, so that it can be adjusted when necessary to meet changing Basin problems and needs. Basically, the program will include (1) adjustments to bring about use of land in accordance with its capabilities, economic feasibility and national needs, (2) improvement of the efficiency of production, marketing and distribution, (3) installation of practices and measures to minimize erosion, retard runoff, conserve and utilize water supplies, stabilize stream channels and minor watersheds, and maintain, rehabilitate or increase the productive capacity of forest, range and crop lands.

This program will be designed primarily to conserve and improve the range, forest, and cropland resources of the Columbia Basin Area. As important by-products, the program will increase agricultural productivity and improve land uses; it will reduce floodwater and sediment damages, and will help protect and use the water resource. The development and use of other resources, such as minerals, wildlife, and recreation, will be brought into the program only to the degree that they directly affect land conservation and use. Within this framework, the agricultural program will support, complement, and balance the work of other agencies.

As a part of the above, the program may include:

1. Technical assistance and other aids in adopting and installing such practices and measures as those mentioned above and in the production and marketing of their crops.

2. Credit to aid communities, groups, land owners, operators and other individuals to organize and operate agricultural enterprises which will provide farm and other families with a satisfactory level of living and which will enable them to participate in the Comprehensive Agricultural Program. Included in the program will be credit to permit (1) reorganization of farm units, (2) acquisition, development, organization and operation of agricultural enterprises, (3) adoption of approved practices and, (4) conservation and best utilization of land and water resources.
3. Investigations
 - (a) Field investigations and surveys for the classification of land, vegetation and water resources.
 - (b) Agricultural investigations and research, including physical, biological, and economic aspects, which are needed to support and give direction to the Basin program.
4. An educational program to accelerate the adoption of forest, soil, range, water, wildlife and recreation measures, together with the best recognized agricultural, home and community practices.
5. Extension of electrical and communication service to rural areas.
6. The protection, management, development and use of federal, state, county and local government lands. This includes not only the installation of practices and measures for forest and range conservation and watershed management, but also the maintenance of such practices and measures whether installed or still to be installed.
7. Adjustments in ownership to assure protection and safe management of lands having important water and other public values which are not safeguarded under existing ownership.

Goals for the Program

Goals for the various phases of the program will express or imply the inclusion of all types of work or activities needed, and participation by all land owners. The quantitative level of installation of measures, however, will need to be guided by economic considerations. It is recognized, for example, that it will be unrealistic and impractical to attain the maximum possible productivity from every acre, or 100 percent application of conservation practices, or complete efficiency in watershed management and fire protection. The program will not stop all soil erosion, eliminate all sedimentation or prevent all forest fires. The intensity of measures and practices to increase production will be related to the economics of production. Investment and costs must be kept in balance with potential return and public benefits. The objective will be to accelerate going programs and to provide for other necessary work to such a degree that foreseeable needs for physical and management measures will be fulfilled within the 20 years of the installation period, so that by the end of the period the necessary facilities for a high level of productivity in the conservation and use of the basin's land resources can be achieved. Upon attainment of this objective the needs for operation, maintenance and replacement must be recognized and met on a continuing basis to assure continuous productivity and to prevent a serious deterioration that would destroy much of the accomplishment of the program.

The various phases of the program must be correlated with each other and with non-agricultural programs for resource and community development in the basin. The program for the Columbia River Basin Area must also properly consider National and Canadian objectives and needs.

Boundaries and Subdivisions of the Area

The area to be covered is shown on the attached map entitled "Columbia River Basin." In general, the five subdivisions of this area include the states of Oregon, Washington and Idaho, plus the St. Maries River and those parts of the Columbia River drainage which extend outside the boundaries of these states, but do not include the Klamath, Goose Lake and Bear River drainages and minor tributaries to the Great Salt Lake Basin. Consideration will be given to the problems associated with the Canadian portion of the Columbia River drainage.

Form of Presentation

The material included in the study and report will be such that it can be drawn upon for many purposes. For example, (1) to enable complementing the program and plans for major stream developments, (2) to awaken informed interest and support on the part of the affected public, and (3) to serve as a guide for subsequent more detailed plans and designs and operating plans of public agencies, and of private agencies which must be expected to play a substantial, if not a dominant part in carrying out the program.

The report will set forth the situation, the problems, the goals, and the means and measures recommended to attain the goals. The needs and what benefits are to be obtained by meeting them will receive major stress. The measures recommended will be described by classes and quantities.

In addition, there will be shown the estimated costs of the measures. The study and report must develop and demonstrate a sound basis for the findings, and furnish convincing support for the recommendations.

The report will be presented in such form that legislative approval will constitute authorization for the necessary program appropriations within the limits of existing laws governing the kinds of work included. The report will indicate clearly the extent to which authority for work recommended is lacking and will outline the character of new legislation that is needed for its accomplishment. Estimates will be shown in a way which will permit identifying future budget requests and expenditures with each segment of the program. To assure meeting requirements in these respects, the cooperation of the Solicitor's Office and of the Office of Budget and Finance will be enlisted before the work gets underway.

It is not necessary in the report to define agency responsibility for carrying out the program. The job is to decide what needs to be done, not who should do it. The only exception to this will be in separate estimates for work to be done on lands controlled by the Department of the Interior or other public agencies.

The Columbia River Basin Area will be subdivided into the five following subdivisions:

Subdivision #1 - The Pacific Coast. That part of the basin west of the Cascades.

Subdivision #2 - That part of Washington east of the Cascades with the exception of Ferry, Pend Oreille, Spokane and Stevens counties, which are commonly accepted as part of the Inland Empire.

Subdivision #3 - That portion of the basin commonly known as the Inland Empire, consisting of Northeastern Washington, Northern Idaho, and Western Montana.

Subdivision #4 - That part of Oregon east of the Cascades.

Subdivision #5 - Southern Idaho, and that part of Wyoming, Utah and Nevada within the Columbia River Basin.

Separate programs will not be developed for each subdivision but information will be assembled and summarized in tabulated form by individual states and subdivisions.

A separate appendix will be prepared for the material under each roman numeral in the attached detailed outline of the report. In these, separate discussions will be prepared for each subdivision of the Basin. In the comprehensive report, these appendices will be condensed and presented as separate chapters.

ORGANIZATION OF THE JOB

Leadership

Development of the comprehensive program and report for the Columbia Basin Area will be carried out under the direction of the Secretary of Agriculture's Field Representative in this basin, as provided for in the Secretary's Memoranda #1256 and #1257. His responsibilities will include the preparation of a statement of purpose and goals and of an outline and working plan for the comprehensive program report; the assignment of responsibilities to agency representatives on the Field Committee and coordination of their efforts throughout the progress of the program development; arbitration and settlement of differences in principle and procedure among the agency representatives insofar as such differences can be resolved at the field level; the coordination of data collection by the various task forces, followed by synthesis of the final plan and preparation of the report; initiation and maintenance of contact with state agencies, other Federal departments, and other public and private agencies to cultivate wholehearted collaboration; coordination of publicity and information releases regarding the agricultural program; and overall administrative direction of the program.

Field Committee

The Secretary's Representative will be assisted by a Field Committee consisting of one representative from each of the following: Agricultural Research Administration, Bureau of Agricultural Economics, Extension Service, Farm Credit Administration, Farmers Home Administration, Forest Service, Production and Marketing Administration, Rural Electrification Administration and Soil Conservation Service. It is provided that a representative of the Pacific Northwest Land Grant Institutions will be included as a member of the Field Committee.

The members of the Field Committee will advise, assist and be responsible to the Secretary's Representative in preparing the comprehensive agricultural program for the Columbia Basin Area. Each member will be responsible to his Chief in matters affecting bureau policy, but will also assist the Secretary's Representative in harmonizing the needs of his bureau with those of the agricultural program.

Staff Assistance

A professional writer will be assigned to the Secretary's Representative to supervise the actual writing and the assembly of material for the report. A high-caliber assistant and such clerical help as may be necessary will be provided to handle administrative matters and to help in the coordination of all matters having to do with the comprehensive program.

Flood Control Surveys

Survey activities are already under way in the Columbia Basin Area, obtaining information for a program of runoff and waterflow retardation and soil erosion prevention. This work is being carried on by personnel of four Forest Service experiment stations and the Soil Conservation Service, with general coordination by a survey committee functioning under the respective Experiment Station and Regional Directors. The contents and results of this survey will be incorporated directly into the agricultural program report.

In its integration with the comprehensive agricultural program, the flood-control survey will be coordinated by the appropriate agency representatives on the Field Committee. To facilitate this coordination, a representative of the flood-control survey will participate with the Field Committee in all activities having to do with flood-control needs and programs. The flood-control survey groups and analyses will, however, retain their identity so as to insure that the requirements of the Flood Control Act can be satisfactorily met.

Subcommittee and Task Force Organization

Work in developing the agricultural program report will be done by means of subcommittees. Each subcommittee will consist of a Field Committee member from each interested Department agency with the chairman appointed by the Field Committee chairman. The flood-control survey will be represented on each subcommittee having to do with matters involved in the Flood Control Act. In their participation, the flood-control representatives will have a full voice in discussions and in presenting and supporting the needs of the flood-control survey in the agricultural program. They will not vote, however, in matters to be decided by vote.

Working with other members, each subcommittee member will spearhead the assembly and coordination of information in his agency's field of interest. In this job he will supervise the work of other men who are assigned by his agency to collect program data. Fulfilling mutually agreed-upon assignments with the subcommittee, he will also be responsible for the collection of information from other agencies.

In helping the subcommittee carry out the functions assigned by the chairman of the Field Committee, each subcommittee chairman will have several major responsibilities. First, he will organize and coordinate the work done by the subcommittee, so that the necessary data and other information are assembled at the proper time and in an appropriate form to be presented to

the Field Committee for use in other parts of the Basin analysis and in the report. Second, he will guide or assist in the resolving of any differences in principles or procedures among the members of his subcommittee. Where any matters arise in which a subcommittee member is firmly convinced there is a conflict with his agency's procedures or policies, this conflict will not be arbitrarily settled by majority vote or subcommittee chairmanship decision. If the subcommittee member cannot see his way clear to accept a compromise decision, the problem placed in writing by each member concerned will be referred to the Field Committee. If the problem cannot be resolved at this level, it will be referred to the Field Representative for further action.

Membership in any subcommittee conveys the responsibility for obtaining the best available unbiased information for the program report. Where comparable information is available from two or more agencies, the subcommittee's duty will be to harmonize these data so as to provide the most dependable estimates which can be obtained. Subcommittee chairmanship does not, therefore, carry with it any privileges for the preferential use of data from his own agency.

The subcommittees will be assisted by task forces. These will be composed of specialists in the field to which they are assigned. For example, on public forest lands the force will be composed of one representative from the Flood Control Survey organization and one from each of the Forest Service regions involved in the Basin. Using plans and lists of measures prepared jointly by the Field Committee and the Flood Control Survey organization, a team of men working for the task force in each region will obtain data from the national forests and from organizations handling other public forest lands. The information obtained will include the work being done under going programs, the quantities of each measure needed to meet the requirements of the flood-control surveys, and the additional amounts needed for the comprehensive agricultural program. For private forest lands, a task force will be composed of representatives of these same agencies and other agencies interested in programs on private lands. Field Committee membership, subcommittee assignments, and agency representation are shown on pages 1 and 2.

Relations With Other Agencies

It is essential that adequate consideration be given to the interests of Federal agencies outside the Department of Agriculture, State agencies and other agencies interested in any aspects of the comprehensive program. Cooperative arrangements with these agencies will be needed for the development of the comprehensive program, with some special adaptations to meet the requirements of the flood-control survey portion of the report. It is proposed that cooperation for the flood-control survey part be handled essentially as it has been on other flood-control surveys conducted by the Department of Agriculture. In this process, data will be assembled for a number of sample drainage areas. These data will be obtained by field crews of the Department of Agriculture, with informal consultation with the field personnel of other administrative agencies involved. The following types of information will be obtained from the representatives of these agencies:

1. Information on local flood and erosion problems.
2. Areas of various land uses, cover types, and land conditions.
3. Going and recommended resource conservation and development programs.

Aside from the special features outlined for flood control, agency cooperation for the comprehensive program is proposed on the following basis:

1. A detailed outline for the comprehensive agricultural program will be furnished interested agencies for their review, comment and guidance.
2. Through their administrative heads, these agencies will supply quantitative information for lands under their administration, as called for by the above-mentioned outline, for inclusion in the Department of Agriculture's report. Opportunity will be provided for the correlation of information furnished by these agencies for their lands with the information developed by the Department of Agriculture for the other lands in the Basin.

OUTLINE OF REPORT

The attached detailed outline shows the organization of work and of the report, with suggested tables, charts and other illustrations to accompany the report. This outline is in sufficient detail to serve as a guide for the preparation of analyses and discussions which will form a preliminary report. These will then be used as appendices to a shorter, more condensed document which will form the final comprehensive report to be submitted to the Congress.

I. Introduction

This will be a purely narrative section, summarizing the salient features of the report.

A. Need for a Comprehensive Agricultural Program

1. National aspects
2. Columbia Basin needs

B. Historical Background

1. National aspects: The growth of concepts of river basin development, as exemplified by the problems and thinking which led to Missouri Valley and Tennessee Valley activities.
2. Developments in the Columbia Basin: State and local planning organizations; Corps of Engineers "308" and other development studies; programs of the Department of the Interior, including Bureau of Reclamation, Bureau of Land Management, and other agencies; and Department of Agriculture activities.
3. Growth in Basin population; increasing demand for resources.
4. Need for balanced development of land and water resources, supplementing and protecting stream channel and other developments.

C. Purpose of the Program

D. Description of the Program

1. Area covered
2. Content of Program

II. Basin Area Characteristics

This section of the report will be largely narrative, emphasizing mainly the quantities, conditions and status of development of present resources in the Basin.

For the development of basic material, the procedure will be to determine present physical conditions, including plant cover and its condition, soils, erosion, climate, potential productivity of the land, use and occupancy, flood

and erosion damages, damage areas, etc. This type of work will be started immediately by all flood control survey groups concerned. Physical data needed for the comprehensive agricultural program will be collected and tabulated by the flood control survey and the Field Committee members. Sample areas will be studied in detail to provide data for hydrologic analysis and to familiarize land-use technicians with specific conditions as a basis for program planning.

Considerable factual information, including research and survey data, is available at the colleges and State Department offices in the Columbia Basin, as well as in the offices of the Department agencies involved in the Field Committee. Therefore, the report should contain only enough descriptive material to provide essential background for program recommendations.

Description of physical aspects of each subdivision will be brief and pointed. It is not desirable to load the report with detailed factual material on climate, soils, geology or other descriptive factors not needed for an understanding of the program. Accordingly, although the outlines are carried out in some detail on factors such as these, it will be understood that these details are indicated merely to show the contents of brief factual discussions. This narrative material will be used to describe present and potential problems in the conservation, development and use of agricultural and forest resources.

A. Location and size

Base map showing states, counties, principal streams, county seats, major area subdivisions.

B. Physical and biological conditions

1. Physiography

Map of land forms showing topography, orientation of mountain ranges, agricultural lowlands, etc.

2. Soils and Geology

Map of geology and soils.

a. Parent material: by type, age, condition

b. Land capability classes

Area tables and map of land use potential, to indicate productivity and best use under the program to be recommended, based upon Land & Water Inventory, Forest & Range Surveys, and other sources.

3. Climate

a. Precipitation

- (1) Rainfall--amount, seasonality, and distribution geographically--general storms, local storms, intensity

Maps showing isohyets for average annual precipitation, cloudburst areas, and block graphs of the monthly distribution of precipitation at various points.

(2) Snowfall

Map showing principal snow areas

b. Temperature

(1) Ranges--seasonal and diurnal

Map showing block graphs of monthly temperature at various points.

(2) Frost occurrence--growing season

Map showing isopleths for length of frost-free growing season

(3) Snow melt relationships

c. Wind, evaporation, and transpiration

4. Water yield

a. Quantities available

b. Source

(1) Forest land

(2) Range and brush land

(3) Cropland

c. Flood occurrences (historical) magnitude, frequency

Frequency/magnitude distribution graphs. Stream profiles and stream-flow charts in graphical or diagrammatic form, as needed.

5. Erosion and sedimentation

a. Erosion source areas

(1) Location and type

(a) Slope: Sheet and gully

(b) Channel: Bankcutting and degradation

Maps showing major flood and erosion source areas

(2) Rate of soil loss

b. Sedimentation

(1) Channel debris loads; rates of movement

(2) Suspended loads; turbidity

Tables of erosion and sedimentation data in quantitative terms by the required breakdowns of land use, land ownership, land management and political subdivision

6. Land cover

a. Forest land: Condition, type and effects of past use

b. Range land: Condition, type and effects of past use

c. Cropland, non-irrigated: Condition, types of crops and effects of past use

d. Cropland, irrigated: Condition, types of crops and effects of past use

e. Other: urban areas, rock barrens, dunes, lakes and streams, glaciers, road and highway surfaces, graveyards and similar non-program areas

Map of cover types: Forest, range, and agricultural land.

Summary tables of cover data by land ownership.

U. S. Department of Agriculture

U. S. Department of the Interior

Other public agencies: federal, state, county, municipal
Private

C. Economic Development

(Throughout this section on economic development, four items should be emphasized in describing economic characteristics of the basin. These four items are: (1) description of the present situation; (2) trends over recent years; (3) relative position of the basin to the nation; (4) competitive position of the basin with other area.)

Tables and maps showing land ownership by federal bureau, state, county, municipal, and private categories, with summaries by major area subdivisions and political subdivisions as needed.

1. Population

a. Total population

(1) Trends

Tables showing present population and trends by states and major subdivisions.

Charts showing population growth curves for key cities of the basin.

(2) Birth and death rates

(3) Migration

b. Distribution of population

(1) Urban, rural farm, rural non-farm

Map showing population density by means of dot clusters

Map showing density of farm population

(2) Trends

c. Composition and characteristic of population (age, male-female ratio, income, race, labor force, skills.)

2. Water resource

a. Importance of water to agriculture, manufacturing, mining, fisheries, commerce, including navigation, recreation, and urban civilization.

Tables showing water supplies in average annual amounts by streams and ground-water basins

b. Present utilization of water

- (1) Hydro-electric power
- (2) Domestic and industrial uses
- (3) Irrigation
- (4) Navigation
- (5) Fisheries
- (6) Recreation

Tables showing present water use (for power development, domestic and industrial uses, and irrigation) by counties and other subdivision as needed in terms of total annual amounts.

3. Other resources and industry

a. Agriculture

(1) Number of farms

Tables showing number of farms, by irrigated, non-irrigated, and livestock classes, in size-classes, with breakdowns according to major sub-areas and political subdivisions as required.

(2) Type of farming areas

Map of generalized type of farming area, including range types.

Map showing seasonal uses of range lands.

(3) Size of farms

(4) Principal crops and livestock

Acreage or numbers; income; competitive position with other areas

Tables showing production of principal crops (including livestock) in the classes and with the breakdowns noted just preceding.

Tables showing farm income from sale of crops, as preceding.

Tables showing value of farm products per acre, as preceding.

(5) Income from farming

Tables showing value of farm land and buildings, as preceding.

(6) Irrigation

Total acreage irrigated principal crops, and relative position

Charts showing farms irrigated, as preceding

(7) Drainage

Acreage drained, general location

Tables comparing agricultural statistics for the Columbia Basin with those for the United States, using breakdowns as preceding.

(8) Agricultural employment

Tables showing employment on farms, as preceding, segregating year-long and seasonal

(9) Part-time farming

(10) Processing of agricultural products

(a) Types and volume of processing

Map showing processing centers for agricultural (including livestock) products and forest products.

Tables showing types, volume, and values of processed agricultural products; with breakdowns by major sub-areas or political subdivisions as required.

- (b) Trends
- (c) Number of persons employed

Tables showing numbers of people employed in processing agricultural products; with breakdowns as preceding.

b. Forestry and forest products

- (1) Raw material
 - (a) Inventory
 - (b) Depletion
 - (c) Growth
 - (d) Sustained yield capacity

- (2) Timber harvesting (logging)
 - (a) Volume
 - (b) Species
 - (c) Source
 - (d) Potential employment

Tables showing numbers of people employed in forestry and timber harvest; with breakdowns as preceding.

Tables showing types, volumes, and values of timber production and processed forest products; with breakdowns as preceding.

- (3) Farm forests
 - (a) Importance as a source of timber
 - (b) Importance as a source of supplemental farm income
- (4) Timber manufacture--volume, value, raw material, value added by manufacture, employment
 - (a) Primary--lumber, pulp, plywood, etc.
 - (b) Secondary

Tables showing numbers of people employed in processing forest products; with breakdowns as preceding.

Tables showing types, volumes, and values of timber production and processed forest products; with breakdowns as preceding.

(5) Other forest industries

c. Wildlife

(1) Numbers by types and species

(2) Hunter-fisherman use

(3) Value of wildlife crop

(4) Land use

d. Outdoor recreation

(1) Land use--classified recreation areas

(2) Number of recreation developments by classes, such as camp grounds

(3) Recreation use--number of recreationists (by classes, such as campers)

(4) Income from recreation

Tables showing number of people employed and income from recreation

e. Minerals and mining

(1) Occurrence of minerals

(2) Present development and production

Tables showing types of, volumes of, and income from mineral products

(3) Exploration, prospecting and mapping

(4) Processing in the area

(5) Amount of employment

Table showing number of people employed

f. Commercial fisheries

(1) Source and kinds

(2) Production, volume and value

- (3) Processing
- (4) Employment
- g. Other manufacturing industries
 - (1) Principal types
 - (2) Dependency of manufacturing on water
 - (3) Dependency upon agriculture
 - (4) Value added by manufacturing

Tables showing types, volumes, and values of manufacturing (other than agricultural and forest products), with breakdowns by major sub-areas and political subdivisions as required

- (5) Trends in manufacturing
- (6) Competitive position with other areas
- (7) Employment

Tables showing numbers of people employed in manufacturing; with breakdowns as preceding

4. Utilities

- a. Power-hydro-electric and steam

Tables showing types, amounts, and values of electric power production according to producing agency or source; with breakdowns by major sub-areas and political subdivisions as required.

- b. Communications

5. Transportation

- a. Centers of population
- b. Location of markets for agricultural and timber products
- c. The transportation networks: Rail, road, air, water

Tables showing tonnage and revenue of goods and passengers transported by air, rail, highway, and water, including ocean traffic; with breakdowns as preceding.

6. Commerce

- a. Employment provided by commerce

b. Trends in commerce

II. Problems and Goals

This part of the report will be developed jointly by the Field Committee and the Flood Control Survey organization. It will be based largely on the facts developed in the preceding section of the report, as well as on special studies of Basin problems. Like the discussion of physical characteristics, it will be largely a narrative section, although it should be developed in somewhat greater detail. Throughout this section the writer should discuss watershed and research aspects wherever applicable to the resource problems and goals.

A. Cropland

1. Drainage
2. Irrigation
3. Prevention of soil deterioration
 - a. Maintenance of fertility
 - b. Erosion control
 - c. Flood reduction
4. Weed, pest and disease control
 - a. Noxious plants
 - b. Insect pests
 - c. Rodents and game animals
 - d. Plant diseases
5. Submarginal lands
6. Improvements in use and management to increase production
7. Tenure

Tables showing areas in need of treatment, and maps showing locations and extent; the tabulations segregated by major sub-areas, watersheds, and political subdivisions, etc. as required.

B. Forest Land

Tables showing areas in need of treatment, and maps showing locations and extent; the tabulations segregated by major sub-areas, watersheds, and political subdivisions, etc. as required

Maps to include fire occurrence, fire hazard zones, areas of insect outbreaks or disease epidemics, etc.

1. Mature forest lands. The primary objective is to convert to growing forests at a realistic level of productive capacity as rapidly as demand permits.
 - a. Accessibility problems
 - b. Lack of management facilities
 - c. Destructive cutting practices
 - d. Need for technical assistance to private forest land owners
 - X e. Need for improving utilization practice including minor species and unused material
 - f. Need for improving stand quality
2. Second-growth forests. The primary objective is to improve the productive capacity and utilization practices.
 - a. Premature and destructive cutting
 - b. Need for stand improvement, including thinning, pruning, and interplanting
 - c. Need for technical assistance to private forest land owners
3. Nonstocked forest lands. The primary objective is to restore these lands to a satisfactory growing condition
 - a. Reforestation--public lands
 - b. Planting aids to private owners
4. Ownership problems
 - a. Size of ownership
 - b. Intermingled ownerships
 - c. Ownership instability
 - d. Tax problems
 - e. Credit and insurance problems
5. Forest protection problems
 - a. Fire
 - b. Insects and disease
 - c. Other

6. Forest watershed problems

C. Range land

Tables showing areas in need of treatment, and maps showing locations and extent; the tabulations segregated by major sub-areas, watersheds, and political subdivisions, etc. as required.

1. Range conditions
 - a. Trends and causes
 - b. Effect on watersheds
 - c. Effect on livestock and game
2. Range control problems
 - a. Livestock control
 - b. Big game control
 - c. Range improvements needs
3. Range use
 - a. Integration of use on public lands between agencies and with private lands
 - b. Imbalance of seasonal range
 - c. Balancing game and livestock use
4. Range protection
 - a. Fire
 - b. Control of noxious and undesirable vegetation
 - c. Rodents and predators
 - d. Insects and disease--grasshoppers, crickets, etc.
5. Tenure
 - a. Size of ownership unit
 - b. Pattern of ownership
 - c. Tax problems
 - d. Grazing fees

D. Other problems 1/

1. Water

a. Flood and sediment damages

(1) Flood damages (inundation, erosion)

(a) Urban and industrial

(b) Utilities and transportation facilities

(c) Agricultural

Crop and property losses

Land losses by erosion

(2) Sediment damages

(a) Reservoir deposition

(b) Agricultural land deposition

(c) Navigation facilities

(d) Irrigation works

(e) Other: urban, industrial, wildlife

Tables and maps showing areas subject to inundation and deposition, segregated as indicated for item III-A.

b. Water yields

(1) Stream flow distribution, shortages

(2) Ground water

Maps showing areas of water surplus and deficiency, with ground-water areas outlined

c. Pollution

2. Wildlife and recreation

a. Protection, and prevention of deterioration

Tables showing trends in game animals census, commercial and sport fish catch, and recreational use, segregated by sub-areas, watersheds, political subdivisions, etc. as required.

1/ These involve problems which cannot be segregated to either cropland, forest land or range land.

- b. Administration and management problems
- c. Inadequacy of facilities
- d. Conflict with other uses
 - (1) Correlation with reservoir operations
 - (2) Sanitation and pollution
- 3. Fisheries
 - a. Effects of bad land practices
- 4. Processing and distribution
 - a. Transportation -- accessibility
 - Map showing transportation deficiencies
 - b. Utilities
 - (1) Adequacy of power and communication services
 - Map showing areas with inadequate power and communication facilities
 - c. Processing
 - (1) Adequacy of facilities
 - (2) Labor availability
 - (3) Effects on utilization and local resource development
- 5. *d. Problems of production and marketing*
Human
 - a. Living conditions
 - (1) Inadequate housing
 - Tables showing housing shortages, using area subdivisions as needed
 - (2) Inadequate domestic facilities
 - (a) Water
 - (b) Power and light
 - b. Production efficiency
 - (1) Lack of facilities
 - (2) Lack of know-how

(3) Need for financial assistance

Tables showing loan delinquencies, segregated as preceding

6. Minerals

IV. The Program

The program will consist of work along the lines of present activities, plus additional types of work not now being done to attain full development, conservation and use of the land and water resources of the Basin. In this chapter, separate discussions will be devoted to total program needs, present programs and work needed beyond present programs to accomplish total needs.

The discussion of present programs will describe types, extent and costs, in so far as possible, of present activities in the Basin directly related to the objectives of the agricultural program. Fiscal year 1949 expenditures will be indicated for all activities to be included, separating operation and maintenance from investment and installation costs.

In presenting the additional program needs, estimates for both capital investments and recurrent annual costs will be confined to work to be done over and above that now being carried out in the Basin. Present programs will not be included; they are assumed to continue at present rates for the twenty-year period of installation of the program, and to that extent are deducted from the program.

Program estimates will show separately the needs for flood control and the total needs for the comprehensive program.

Legislation needed to authorize the expansion of the scope of current activities or the institution of desirable activities will be discussed briefly in connection with the measures or parts of the program benefited. These legislative needs will be grouped and discussed more fully in a section at the end of the chapter. The general purpose is to help develop or improve and use the land, water and forest resources of the Basin, so that they may contribute most effectively to the well-being of the people. Watershed and research aspects will be integrated with the conservation and use program throughout the report.

Installation costs will include all investment costs required for structural improvements and other program measures, including materials, equipment, labor, planning and supervision, by whomsoever incurred. Where labor is performed by the owner of the land it will be evaluated on the basis of hired labor for the same class of work. Cost of installations will be based on the series of indices developed by the BAE, expressing estimates of anticipated costs. The cost will include measures to maintain or improve productive capacity of the land (such as terraces, seeding grasses and legumes and forest tree planting) but not the normal processes of crop production and marketing on private land, nor owner's overhead costs. A distinction will be made between planting to rehabilitate non-productive and understocked forest lands and planting which is done currently in lieu of provisions for satisfactory natural regeneration under state forest conservation laws. The latter is considered a normal process of crop production.

The Steps Required to Develop the Agricultural Program

1. Capital Investments

- (a) Estimate quantities of all practices and measures needed to achieve the goal set for the development of the Basin's land, water, forest and range resources in a period of twenty years, starting with the resources as they are at present. Show these estimates separately for each item of the following outline, also separating quantities to be installed on lands recommended for acquisition.

Federal

U. S. Department of Agriculture
National forests
Other

U. S. Department of the Interior
Bureau of Land Management
Other

Other Federal

Non-Federal Public (State, County and Municipal separately)

Private

- (b) Estimate the quantities of work which will be accomplished by the continuation at present rates of present programs for the twenty-year program installation period. Show these estimates separately for each item as outlined above. The 1949 appropriation figures for determining the size or magnitude of going program will be used. Average rate of accomplishment would be determined by use of average rate for the period 1945-49, adjusted if necessary to conform to the 1949 fund situation. Each agency, FS, SCS, PMA, Ext., will supply information on how the available appropriation would be spent on the average.
- (c) Subtract the estimates shown in 1-b from those shown in 1-a to secure the additional quantities required for the accelerated comprehensive program.
- (d) Determine the cost of the accelerated program by applying unit costs to the resulting quantities.

2. Operation Maintenance and Replacement Costs

- (a) Estimate the annual unit cost of operating and maintaining each of the activities and facilities included in the agricultural program. Include also annual unit costs of replacement of recurrent measures.
- (b) Multiply the quantities obtained under 1-a and 1-b by these unit costs, to obtain the total annual costs of operating, maintaining and replacing the activities and facilities provided by the total and going programs after installation.
- (c) To obtain the additional annual cost of operating, maintaining and replacing the accelerated program, subtract the annual cost of maintaining 1-b from that of maintaining 1-a.

In general, the aim of the program will be to include only measures that will return economic, social and other public values exceeding the outlays (costs and sacrifices). The quantitative relation of benefits to costs will be computed, however, only for those parts of the program directly required for flood-control purposes, as specified in the Flood Control Act.

A. Total program

For each of the items below, program requirements will be shown in tables giving types and quantities of measures recommended. In addition to showing total needs, that needed for water flow retardation will be shown separately. Within the water flow retardation section, independent structural flood-control measures will be segregated also. Tabulations of program quantities will follow the outline below:

1. Conservation, development and use

a. Cropland

(1) Non-irrigated

- (a) Practices to protect soil from wind and water erosion
- (b) Practices to develop cropping systems that protect the soil and restore, improve, and maintain productivity
- (c) Drainage
- (d) Miscellaneous
- (e) Technical services

(2) Irrigated

- (a) Practices to protect soil from wind and water erosion
- (b) Practices to develop cropping systems that protect the soil and restore, improve, and maintain productivity
- (c) Drainage
- (d) Miscellaneous
- (e) Technical services

b. Range land

(1) Private

- (a) Cover improvement
- (b) Management practices
- (c) Protection

- (d) Livestock distribution
 - (e) Technical services
- (2) Public
 - (a) Cover improvement
 - (b) Management practices
 - (c) Protection
 - (d) Livestock distribution
 - (e) Technical services
- c. Forest land
 - (1) Private
 - (a) Reforestation and afforestation
 - (b) Timber stand improvement
 - (c) Forest protection
 - (d) Resource surveys and inventories
 - (e) Resource and development plans
 - (2) Public
 - (a) Reforestation and afforestation
 - (b) Timber stand improvement
 - (c) Forest protection
 - (d) Resource surveys and inventories
 - (e) Resource and development plans
 - (f) Management methods investigative facilities
- d. Plan for practices common to program for both cropland and private range land
 - (1) Insect control
 - (2) Nurseries -- grass and shrub
- e. Plan for practices common to program for both forest and public range land
 - (1) Protection measures

- (a) Fire control measures
 - (b) Measures for control of accelerated erosion
 - (c) Water control measures
 - (d) Shelterbelts and windbreaks
- (2) Administrative and management measures
 - (a) Transportation facilities
 - (b) Communication facilities
 - (c) Structures (Buildings -- all classes)
 - (d) Water and sanitary systems
 - (e) Recreation measures
 - (f) Signs, tools, equipment and miscellaneous
 - (g) Purchase or exchange of land needed for special purposes
 - (h) Resource surveys
 - (i) Resource and development plans
 - (j) Intensified management
- f. Plan for practices common to program for all kinds of land
 - (1) Aerial photographs, surveys and maps
 - (2) Resource surveys
 - (3) Resource plans
 - (4) Wildlife management measures
 - (5) Other basic surveys (cadastral, etc.)
- 2. Research and investigations. For each of the headings under "IV-A-1 Conservation, development and use", discuss the following categories of research:
 - a. Research
 - (1) Basic research
 - (a) Physical
 - (b) Biological
 - (c) Economic

(2) Applied Research

- (a) Program effects on conservation and other fields shown above

Problems in production and marketing

- (b) Obstacles to adoption of program

b. Field investigations

- (1) Soil and land capability surveys
(2) Resource inventories
(3) Economic classifications

3. Education

- a. Academic
b. Extension
c. Information
d. Other

4. Credit

- a. Individual farm families needing credit to carry out Comprehensive Agricultural Program
(1) Number of families
(2) Amount of credit needed
b. Communities and groups needing credit
(1) Number of communities and groups
(2) Amount of credit needed
c. Estimated needs for various phases of Comprehensive Agricultural Program
(1) Land acquisition and development
(2) Equipment and livestock
(3) Farm and home operation
d. Sources of credit. (This will consider amount of credit which can be made available according to present credit practices, legislation and authorization.)

(1) Credit to individual farmers:

- (a) Public -- Farmers Home Administration and State Agencies
- (b) Cooperative -- Federal Land Bank, Production Credit Association and Rural Electrification Administration financed cooperative
- (c) Private -- Commercial banks, insurance companies, and private individuals

(2) Credit to groups of farmers:

- (a) Public --- Rural Electrification Administration, Farmers Home Administration, Federal Intermediate Credit Bank, and State agencies
- (b) Cooperative
- (c) Private

5. Insurance

- a. Cropland
- b. Other

B. Present programs

Table on "Costs of Current Federal Programs (1949)" subdivided into USDA, USDI, and other Federal, showing annual costs of installing, operating, and maintaining these facilities. A second table will show quantities of work to be accomplished by continuation of all present activities and programs (Federal, ~~other~~ public and private) for the 20-year installation period.

All material appearing under "B. Present programs" will be treated under the same outline headings as appear under "A. Total program".

1. Conservation, development and use

- a. Cropland

- b. Range land

2. Research

3. Education

4. Credit

Treatment of credit under "Present programs" will be confined to present credit available to:

- a. Credit to individual farmers
- b. Credit to groups of farmers

5. Insurance

C. Additional program needed

All material appearing under "C. Additional program needed" will be treated under the same outline headings as appear under "A. Total program".

1. Conservation, development and use

- a. Cropland

- b. Range land

2. Research

3. Education

4. Credit

5. Insurance

V. Flood-control Aspects of the Program

Evaluation of flood-control features will be done entirely by the flood-control survey. The work will be coordinated with the Field Committee, however, so that it will fit smoothly into the comprehensive program.

Separate working plans are being prepared for the activities of the hydrologists, land-use men, and economists in developing the necessary flood-control material. For the purpose of this working plan, the following comments will summarize the kinds of work to be done and the principles which will be followed.

Selected watersheds which lend themselves to hydrologic analysis will be studied for the purpose of analyzing present conditions and evaluating possible remedial programs. Relatively detailed studies will be made of flood occurrences and damage in each of these watershed units; of land-use and cover conditions and other pertinent factors; and of possible remedial programs of land treatment and upstream watercourse stabilization. Evaluations will be made of the physical effects of such programs, and the results expanded to larger areas in the Basin. Monetary evaluations will be confined to the watercourse program.

In making comparisons of costs and benefits for all areas and measures, it will be assumed that installation periods will be short enough so that they may be considered "instantaneous" from the viewpoint of interest rates or discounts. The extension of going programs will be based on 1949 appropriations and 1945-1949 accomplishments, extended over a period of 20 years. Interest rates to be used are 2-1/2 per cent for public expenditures and 4 per cent for private. Prices received by farmers by States in 1949 will be used for determining agricultural values, and will be converted to a long-term basis through indices to be furnished by the Bureau of Agricultural Economics.

A. Background (brief discussion)

1. Legal basis for flood-control surveys.
2. Relation of flood-control to comprehensive program
 - a. Flood-control program an integral part of the comprehensive program
 - b. Elements of survey not included in comprehensive program: hydrologic and economic evaluations
3. Organization and procedures

B. The Flood-control Program

1. Comparison with comprehensive program -- data from tables in Chapter IV.
 - a. Land treatment and related ("Group 1")
 - b. Upstream watercourse ("Group 2") program
 - c. Other

Summary tables, quantities of program in broad categories

2. Discussion of the program

C. Program evaluation

1. Physical effects of whole program -- reductions in floods and sediment

Graphs and charts showing reductions

- a. Effects of land treatment
 - b. Additional effects of upstream watercourse program
2. Cost-benefit analysis -- watercourse program only, by hydrologic subdivisions
 - a. Costs
 - b. Monetary benefits

c. Cost-benefit comparisons

Summary tables of costs and benefits

In these analyses, 1949 costs and prices will be used, with adjustments by means of appropriate indices to long-term average levels.

VI. Summary and Recommendations for "Accelerated" Program

Tables on Basin-wide basis, with breakdowns by broad groups of program measures, segregated according to land-use classes (forest, range cropland, etc.), major subareas, and political subdivisions as required, showing program quantities, costs, and benefits in terms of land and water resources, and flood and erosion damage reductions. Dollar values of benefits will be shown only for the upstream watercourse program. The tables will be accompanied by a brief summary statement which will cover additional intangible values to be received as benefits from the program.

- A. Program measures recommended, beyond present programs
- B. Program costs
- C. Program benefits
 - 1. Physical quantities
 - 2. Dollar values of the watercourse program

It is believed that final recommendations and summaries will take better form after some of the preliminary work has been done.

LIST OF PROGRAM MEASURES

Conservation, Development and Use

I. Land Treatment and Related Measures

A. Cropland

1. Non-irrigated cropland

a. Practices to protect soil from wind and water erosion

(1) Contour farming	Total Acres
(a) Contour strip cropping	Acres
(2) Field diversions	Miles
(3) Terraces	Miles
(4) Outlets and farm water courses	
(a) Sod or vegetative waterways	Miles
(b) Mechanical structures	Miles
(c) Erosion detention dams	Number
(5) Field strip cropping	Acres
(6) Field windbreaks (trees)	Miles
(7) Crop residue management	
(a) Stubble mulching	Acres
(b) Orchard prunings and other residues	Acres
(c) Other mulchings (hauled on materials)	Acres
(8) Sub-soiling	Acres
(9) Other mechanical tillage operations for erosion control	Acres

b. Practices to develop cropping systems that protect the soil and restore, improve and maintain productivity

(1) Cover and green manure crops	Acres
(2) Conversion seedings to legumes and grasses	Acres
(3) Seeding of pasture	Acres
(4) Improvement & management of pastures	

- (5) Land clearing to develop better soil conserving cropping systems Acres
- (6) Soil amendments
 - (a) Liming Tons and Acres
 - (b) Fertilizers Tons and Acres
- (7) Weed control Acres
- (8) Rodent control Acres
- c. Drainage
 - (1) Open drains Miles
 - (2) Closed drains Lineal feet
 - (3) Other (mole, chiseling, etc.) Lineal feet
 - (4) Tide boxes Number
- d. Miscellaneous
 - (1) Farm ponds Number
 - (2) Wildlife area management Acres
 - (3) Farm manure management structures Number

2. Irrigated cropland

- a. Practices to protect soil from wind and water erosion
 - (1) Contour farming Total Acres
 - (a) Contour strip cropping Acres
 - (2) Field diversions Miles
 - (3) Terraces Miles
 - (4) Outlets and farm water courses
 - (a) Sod or vegetative waterways Miles
 - (b) Mechanical structures Miles
 - (c) Erosion detention dams Number
 - (5) Field windbreaks (trees)

- | | | |
|-----|--|----------------|
| (6) | Crop residue management | |
| (a) | Stubble mulching | Acres |
| (b) | Orchard prunings and other residues | Acres |
| (c) | Other mulchings (hauled on materials) | Acres |
| (7) | Sub-soiling | Acres |
| (8) | Other mechanical tillage operations for erosion control | Acres |
| b. | Practices to develop cropping systems that protect the soil and restore, improve and maintain productivity | |
| (1) | Cover and green manure crops | Acres |
| (2) | Conversion seedings to legumes and grasses | Acres |
| (3) | Seeding of pasture | Acres |
| (4) | Improvement & management of pastures | |
| (5) | Land clearing to develop better soil conserving cropping systems | Acres |
| (6) | Soil amendments | |
| (a) | Liming | Tons and Acres |
| (b) | Fertilizers | Tons and Acres |
| (7) | Weed control | Acres |
| (8) | Rodent control | Acres |
| c. | Drainage | |
| (1) | Open drains | Miles |
| (2) | Closed drains | Lineal feet |
| (3) | Other (mole, chiseling, etc.) | Lineal feet |
| (4) | Tide boxes | Number |
| (5) | Salinity reclamation | |
| d. | Irrigation Practices | |
| (1) | Irrigation land preparation (new) | Acres |
| (2) | Reorganization of existing farm irrigation systems | Acres |

- | | | |
|------------------|--|-----------------------|
| (3) | Improved water application | Acres |
| (4) | Rehabilitation of off-farm irrigation distribution systems | Miles & Each |
| (5) | Irrigation water development | |
| (a) | Permanent storage | No. & Acres benefited |
| (b) | Overnight storage | No. & Acres benefited |
| (c) | Supplemental supply | Acres benefited |
| e. Miscellaneous | | |
| (1) | Farm ponds | Number |
| (2) | Wildlife area management | Acres |
| (3) | Farm manure management structures | Number |

B. Range Land Resource Measures

1. Private range lands

a. Cover improvement

- | | | |
|-----|---|-----------------|
| (1) | Seeding of ranges and pasture (grasses, herbaceous plants and shrubs). Field and gully plantings protective seedings. | Acres |
| (2) | Other cover improvement measures | |
| (a) | Control of poisonous, noxious and undesirable vegetation | Acres |
| (b) | Water spreading and irrigation | Acres |
| (c) | Furrowing, scarifying, chiseling, and listing | Acres |
| (d) | Soil amendment measures | |
| | 1. Liming | Tons and Acres |
| | 2. Fertilizing | Tons and Acres |
| (e) | Other protective measures (structural) | Acres protected |
| (3) | Management practices | |
| (a) | Deferred grazing and exclusion | Acres |
| (b) | Rotation grazing | Acres |

(c) Plant residue accumulation		Acres
b.	Protection	
(1)	Rodent control	Acres
(2)	Predator control	Acres
(3)	Fire protection	Acres
c.	Livestock distribution	
(1)	Water development	
(a)	Springs and seeps	Each
(b)	Wells	Each
(c)	Ponds and small reservoirs	Each
(2)	Fences	Miles
(3)	Driveways and driftways	Miles
(4)	Miscellaneous stock handling facilities Corrals, loading chutes, docks, etc.	Each
2.	<u>Public range lands</u> (both forest ranges and open range lands)	
a.	Cover improvement	
(1)	Seeding grasses, herbaceous plants and shrubs	Acres
(2)	Other cover improvement measures	Acres
(a)	Control of poisonous, noxious, undesirable vegetation	Acres
(b)	Water spreading and irrigation	Acres
(c)	Furrowing, scarifying, chiseling, listing	Acres
(d)	Soil amendment measures	
	1. Liming	Acres
	2. Fertilizing	Acres
b.	Protection	
(1)	Rodent control	Acres
(2)	Predator control	Acres

- c. Livestock distribution
 - (1) Water developments
 - (a) Springs and seeps, ponds, tanks, etc. Each
 - (b) Wells Each
 - (2) Fences Miles
 - (3) Driveways and driftways Miles
 - (4) Miscellaneous stock handling facilities Each
 - (5) Management methods investigation facilities Project
- d. Resource surveys
 - (1) Range and forage surveys Acres
- e. Resource and development plans
 - (1) Range management plans Acres

C. Forest Land Resource Measures

1. Private forest land measures

- a. Reforestation and afforestation Acres
- b. Timber stand improvements Acres
- c. Shelterbelts and windbreaks Acres
- d. Forest protection
 - (1) Insect control Acres
 - (2) Blister rust control Acres
 - (3) Other tree diseases Acres
 - (4) Rodent control Acres
 - (5) Fire control
 - (a) Fire control improvements
 - (b) Fire control cooperation Dollars
- e. Technical services Dollars
- f. Management methods investigation facilities Project

2. Public forest land measures

- a. Reforestation and afforestation
 - (1) Planting and seeding Acres
 - (2) Nurseries installation Each
- b. Timber stand improvement Acres
- c. Forest protection (except fire control)
 - (1) Insect control Acres
 - (2) Blister rust control Acres
 - (3) Other tree disease control Acres
 - (4) Rodent control Acres
- d. Resource surveys and inventories
 - (1) Timber surveys Acres
 - (2) Forest resource survey Acres
- e. Resource and development plans
 - (1) Working circle management plans Acres
 - (2) Sustained yield unit plans Acres
 - (3) Reforestation plan Acres
- f. Management methods investigation facilities Project

D. Measures Applying to Both Cropland and Range Land

- 1. Insect control
 - a. Grasshopper and cricket control Acres
 - b. Liver fluke, leeches, etc. Acres
- 2. Nurseries -- grass and shrub Project

E. Measures Applying to Both Forest and Range Lands

- 1. Protection measures
 - a. Fire control measures
 - (1) Lookouts, observatories, and guard stations Each
 - (2) Hazard reduction Acres

- | | | |
|-----|---|---------|
| (3) | Fire breaks and lines | Miles |
| (4) | Miscellaneous | |
| (a) | Fire control water development | Each |
| (b) | Equipment (original investment cost) | Dollars |
| b. | Measures for control of accelerated erosion | |
| (1) | Measures to control sheet erosion, dunes, blowouts | Acres |
| (a) | Special tree planting | Acres |
| (b) | Protective seedings | Acres |
| (c) | Contour furrows | Miles |
| (d) | Terraces | Miles |
| (e) | Shelterbelts and windbreaks | Miles |
| (2) | Gully stabilization | Miles |
| (3) | Road erosion control | Miles |
| (4) | Stabilizing slips and slides | Acres |
| c. | Water control measures | |
| (1) | Flood water storage structures | Each |
| (2) | Water spreading | Acres |
| (3) | Channel improvement and stabilization | Miles |
| (4) | Stream pollution control | Project |
| (5) | Terraces | Miles |
| (6) | Ranch ponds | Each |
| d. | Shelterbelts and windbreaks | |
| 2. | <u>Administrative and management measures (Public lands only)</u> | |
| a. | Transportation facilities | |
| (1) | Utilization and development roads | Miles |
| (2) | Trails | Miles |
| (3) | Bridges (major -- over 30' in length) | Each |

	(4) Airplane landing fields and strips	Each
	(5) Helicopter landing spots	Each
b.	Communication facilities	
	(1) Telephone lines and installations	Miles
	(2) Radio installations -- permanent	Each
c.	Structures (Buildings -- all classes)	
	(1) Personnel housing -- dwellings, crewhouses and dormitories	Each
	(2) Offices	Each
	(3) Warehouses, garages and utility buildings	Each
d.	Water and sanitary systems	Project
e.	Recreation measures	
	(1) Camp and picnic areas	(f.u.)
	(2) Shelters, cabins	Each
	(3) Winter sports areas	Each
	(4) Miscellaneous	Each
f.	Signs, tools, equipment and miscellaneous	Dollars
g.	Purchase or exchange of land needed for special purposes	Acres
h.	Resource surveys	
	(1) Recreation	Acres
	(2) Fire	Acres
i.	Resource and development plans	
	(1) Master land-use plan (forest and range)	Acres
	(2) Recreation plan	Acres
	(3) Transportation plans	Acres
	(4) Communication plans	Acres
	(5) Fire plans	Acres

- j. Intensified management
 - (1) Timber Dollars
 - (2) Range Dollars
 - (3) Fire Dollars
 - (4) Other Dollars

F. Measures Applying to all Kinds of Lands

- 1. Aerial photographs, surveys and maps Sq.Mile
- 2. Resource surveys
 - a. Soil and land capability surveys
 - b. Water resources survey
 - c. Flood and erosion control surveys (general)
 - d. Wildlife surveys
- 3. Resource plans
 - a. Wildlife management plans -- including fish
 - b. Flood and erosion control plans
- 4. Wildlife management measures
 - a. Big game
 - (1) Browse planting
 - (2) Water development
 - (3) Fences
 - (4) Other
 - b. Fish management measures
 - (1) Fish habitat improvement -- streams
 - (2) Fish habitat improvement -- lakes
 - (3) Planting aquatic plants and fish foods
 - (4) Fish hatcheries and rearing ponds
 - c. Waterfowl and upland game bird management measures
 - (1) Cover plantings

- (2) Food plantings
- (3) Water developments
- (4) Predator control

II. Measures Not Associated With Land Treatment ("Independent Structural Measures")

- | | |
|--|--------|
| A. Channel improvement and stabilization | Miles |
| B. Dikes and levees | Miles |
| C. Floodwater retarding structures | Number |
| D. Major gully stabilization | Miles |



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